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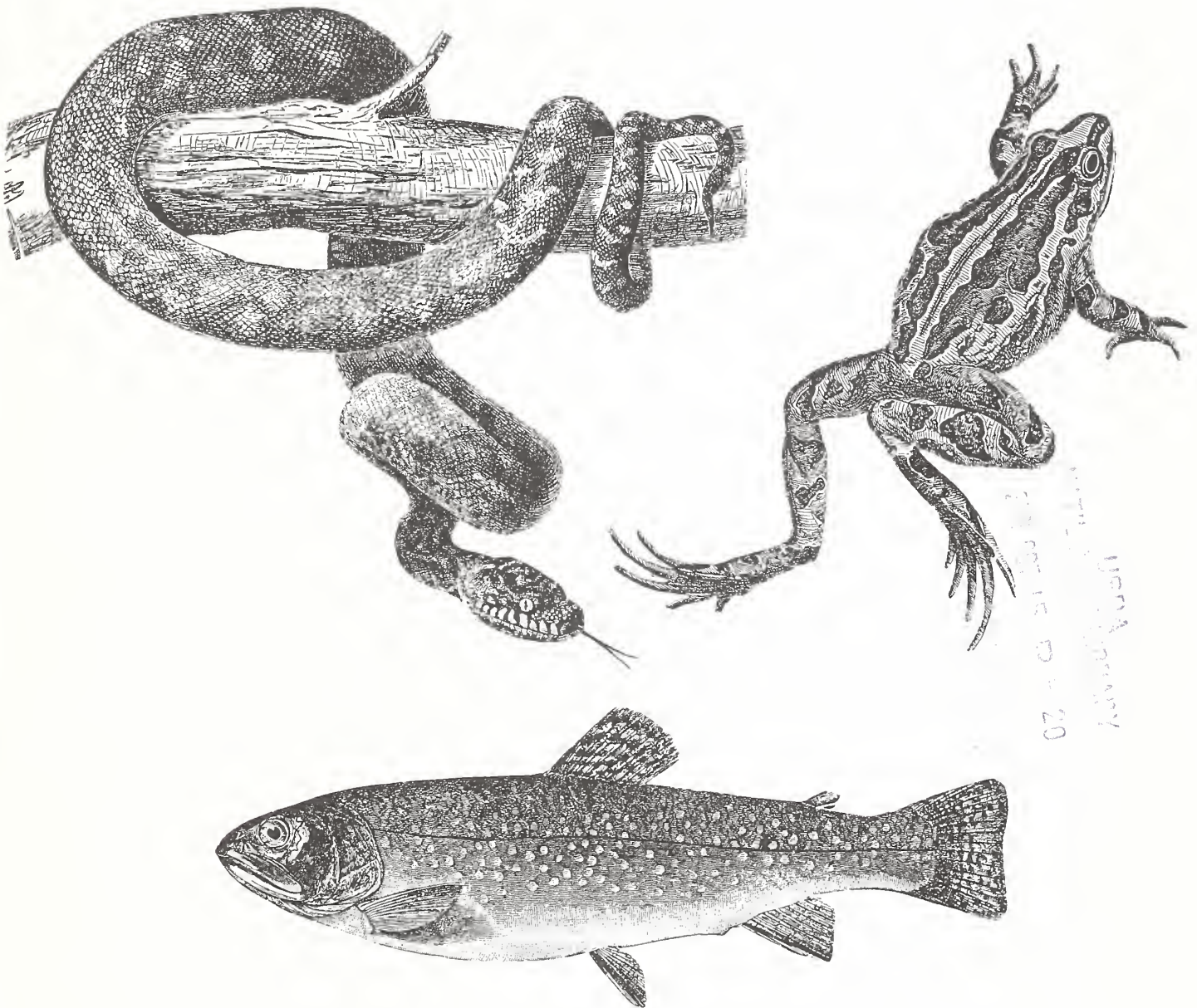
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Information Resources for Amphibians, Fish & Reptiles Used in Biomedical Research

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Information Resources for Amphibians, Fish & Reptiles Used in Biomedical Research

Richard L. Crawford, D'Anna Jensen, Tim Allen

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Information resources for amphibians, fish & reptiles used in biomedical research.

1. Amphibians as laboratory animals--Bibliography.

2. Fish as laboratory animals--Bibliography.

3. Reptiles as laboratory animals--Bibliography.

4. Animal models in research--Information resources.

I. Jensen, D'Anna J. B. II. Allen, Tim (John Timothy), 1953-

III. Animal Welfare Information Center (U.S.) IV. Title.

Z7994.L3

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Introduction

Rodents, non-human primates, dogs, cats, and farm animals have long been the preferred animal models in biomedical research. Their behavioral repertoire and physiological responses to stimuli are more similar to human systems than are lower organisms. However, as amphibians, fish and reptiles become better understood in the field and laboratory, their advantages as alternative animal models are being revealed.

While there are about 4,000 known species of mammals, there are over 4,000 species of amphibian, 6,000 species of reptiles, and more than 20,000 species of fish. Such diversity allows for a wide range of research on specific organs, tissues, and systems that are similar in function, but often less complex than in mammals. Due to differential rates of ova maturation and numbers of gametes produced, elasmobranchs (sharks, skates, rays) are used to study fetal nutrition and toxicology as well as gametogenesis. The monkfish is an important insulin resource for researchers since it contains 20 to 40 times more insulin-producing tissue than the laboratory rat.

Reptiles and amphibians contribute to studies in genetics, embryology, developmental biology, ethology, endocrinology, and immunology. Salamanders and newts are models for limb regeneration. Fetal heart cells of the axolotl (Mexican salamander) will divide and beat *in vitro*. Frogs have played a major role in the development of communication theory. The common anole lizard is used in behavioral studies and can be induced to produce the symptoms of Parkinson's disease. Typical reptile and amphibian studies include aggression, stress physiology, reproductive cycles and dysfunction, and the effects of neurotoxins.

In contrast to mammals and birds which are endothermic (their body temperature is regulated and maintained internally), reptiles, amphibians, and fish are ectothermic with body temperature primarily regulated by ambient temperatures. Since metabolism is driven by body temperature, the rate of normal body functions in these species may be artificially increased or decreased. Thus endocrine, immunological, inflammation, cell physiology, and many other pathways can be easily manipulated.

A major concern to those who might use these species is the necessity of providing a suitable laboratory environment. Unlike mammals and birds, reptiles, amphibians and fish require very specific microenvironments. For reptiles and amphibians, basking sites, water source and water temperature, relative humidity, photoperiod and type of lighting, ambient temperature, group density, cover, method of food preparation and presentation are all factors that influence whether or not the animals will function normally in the laboratory. Fish live in a totally aqueous environment. Type of water (fresh, salt, brackish), pH, salinity, school density, cover, dissolved oxygen, lighting, and filtration are necessary considerations that require monitoring. The animal's needs are often species-specific and failure to meet them results in stress-induced diseases, low growth rate, poor feed efficiency, cannibalism, and failure to reproduce.

Information Resources for Amphibians, Fish & Reptiles Used in Biomedical Research is an attempt to collect in a single volume much of the current information regarding the care and use of these alternative animal models. It is intended only as an introduction to these species as comprehensive coverage would fill several volumes. The authors have selected sample articles that typify recent research. Each animal group has a section of articles and books pertaining to its use in biomedical research followed by a section on its care and use. The latter section highlights not only husbandry and maintenance of particular species, but also regulations, guidelines, and veterinary aspects such as appropriate anesthesia or euthanasia. Because several citations cross phyla, general sections are provided. A final section provides information resources with names and addresses of organizations and their publications that can provide further information. If the citation can be found at the National Agricultural Library (NAL), its call number is given.

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Descriptors: antibodies, Rana, immunoprecipitation, biochemical composition.

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Descriptors: non-hemoparasitic protozoans, amphibians, reptiles.
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Descriptors: pentastomiasis, amphibians, reptiles.
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NAL call no: 444 L952
Descriptors: fish, amphibians, reptiles, birds, calcium regulation.
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Descriptors: pain perception, stimuli, morphine, opioid receptors, *Rana*.

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Descriptors: neurons, stress, brain stem, amphibia.

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Descriptors: pallium medial, learning behavior, partial reinforcement, lesions, Bufo.

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Descriptors: mu-conotoxin GIIIA, effects, synaptic transmission, *Rana*.

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Descriptors: amphibian, auditory system, evolution.

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Descriptors: *in vivo*, epidermis, influx, efflux, toads, axolotl.

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Descriptors: comparative studies, oxygen consumption, *Rana*, *Bufo*, bioenergetics.

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Descriptors: frog, contractility, organs, smooth muscle, cyclopiazonic acid.

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Descriptors: Parkinson's disease, toxicity, nucleic acids.

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Descriptors: antibiotics, external application, survival, laboratory frogs.

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Descriptors: amphibian, mollusc, skin, amines, peptides, comparative research.

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Descriptors: genes, alternatives.

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Descriptors: *in vitro*, *in vivo*, spinal cords, neurons, NMDA receptors, antagonist, quisqualate, kainate polysynaptic, monosynaptic.

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NAL call no: 447.8 J82

Descriptors: frog, magnesium, striated muscle.

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Descriptors: amphibians, transplantation, immunity.

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Descriptors: experimentation, breeding, review.

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Language: German.

NAL call no: Q57.V47 d.8 no. 3

Descriptors: salamanders, sympathetic nervous system, development history.

AMPHIBIAN CARE AND USE

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NAL call no: 470 Sci2

Descriptors: hyla, infections, trematode, deformities, mortality.

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NAL call no: 41.8 Am3

Descriptors: frogs, *Xenopus laevis*, flavobacterium meningosepticum, outbreaks.

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NAL call no: SH1.F8

Descriptors: *Rana*, disease resistance, beta-glucan, stress, bacterial diseases.

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NAL call no: 470 Sci2

Descriptors: frogs, trematodes, infection, deformities.

Anesthesia of amphibians. Wright, K.M. *Proceedings of the North American Veterinary Conference*. Eastern States Veterinary Association, Jan. 10-14, 1998, v. 12. p. 823.

NAL call no: SF605.N672

Descriptors: amphibia, anesthetics, anesthesia.

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NAL call no: QP501.C6

Descriptors: amphibia, toads, pancreas, insulin secretion, carbohydrates.

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NAL call no: QL55.A1L33

Descriptors: laboratory animals, frogs, housing.

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NAL call no: SF405.5.A23

Descriptors: *Xenopus*, laboratory rearing, housing, feeding, temperature, husbandry.

Treating the septic amphibian. Wright, K.M. *Proceedings of the North American Veterinary Conference*. Eastern States Veterinary Association, Jan. 10-14, 1998, v. 12, p. 824-825.

NAL call no: SF605.N672

Descriptors: amphibia, sepsis, treatment.

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NAL call no: SF981.P72 1997

Descriptors: amphibia, animal husbandry, veterinary medicine.

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NAL call no: 410.9 P94

Descriptors: Xenopus, capillaria, ivermectin, oral, injection, topical.

Hepatitis in the green tree frog (*Litoria caerulea*) associated with infection by a species of Myxidium. Hill, B.D.; Green, P.E.; Lucke, H.A. *Australian Veterinary Journal*. Brunswick, Vic.: Australian Veterinary Association, Dec. 1997, v. 75 (12), p. 910-911. ISSN: 0005-0423.

NAL call no: 41.8 Au72

Descriptors: hylidae, myxidium, protozoal infections, hepatitis, histopathology.

An innovative aquatic non-recirculating system for use in housing African clawed frogs (*Xenopus laevis*). Rogers, W.P.; Simpson, T.W.; Jones, L.M.; Renquist, D.M. *Contemporary Topics in Laboratory Animal Science*. Cordova, TN: American Association for Laboratory Animal Science, Nov. 1997, v. 36 (6), p. 72-74. ISSN: 1060-0558.

NAL call no: SF405.5.A23

Descriptors: Xenopus, aquatic animals, water supply, housing, environment.

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NAL call no: 41.8 V641

Descriptors: Xenopus, dermatitis, nematode infection, diagnosis, treatment.

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NAL call no: SF459.F83B37 1996

Descriptors: frogs as pets, toads as pets, Hylidae.

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NAL call no: SF605.N672

Descriptors: amphibia, veterinary medicine.

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NAL call no: 41.8 Am3

Descriptors: tiletamine/zolazepam, anesthesia, bullfrog, leopard frog.

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NAL call no: 41.8 V641

Descriptors: Rana, iridovirus, mortality, viral diseases.

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NAL call no: SF605.N672

Descriptors: frogs, protozoal infections.

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Bonetti, M.; Lavazza, A.; Gelmetti, D. *Veterinary Record*. The British Veterinary Association, Dec. 24-31, 1994, v. 135 (26), p. 625-626. ISSN: 0042-4900.

NAL call no: 41.8 V641

Descriptors: Rana, skin disease, herpesviridae, outbreaks.

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DVM, *Lab Animal*, May 1993, v. 22 (5), p. 25-29. ISSN: 0093-7355.

NAL call no: QL55A1L33

Descriptors: enrichment, environment, African Clawed Frog, *Xenopus laevis*.

Keeping and breeding amphibians: Caecilians, newts, salamanders, frogs, and toads. Mattison, Christopher. London: Blandford, NY: Distributed in the U.S. by Sterling Pub. Co., 1993, 224 p., col. ill. ISBN: 0713723289.

NAL call no: SF459.A45M38 1993

Descriptors: captive amphibians, breeding.

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Cunningham, A.A.; Langton, T.E.S.; Bennett, P.M.; Drury, S.E.N.; Gough, R.E.; Kirkwood, J.K. *Veterinary Record*. The British Veterinary Association, Aug. 7, 1993, v. 133 (6), p. 141-142. ISSN: 0042-4900.

NAL call no: 41.8 V641

Descriptors: Rana, poxviridae, mortality.

Alternatives to the use of mammals for pain research. Stevens, C.W. *Life Science*, v. 50 (13), p. 901-912 (1992).

NAL call no: 442.8 L62

Descriptors: amphibia, pharmacology, physiology, biochemistry.

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Descriptors: improved housing, frogs.

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Descriptors: animal testing, alternatives, literature reviews.

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Descriptors: environmental pollution, health risk, rainbow trout, guppy, zebra fish, medaka, advantages to use.

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Descriptors: carcinogenesis, embryology, cardiology, kidney function.

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Descriptors: nervous system, axons, sensory.

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Descriptors: toad fish, osmolyte, CPS I, CPS III, mitochondrial arginase.

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NAL call no: 442.8 B52

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NAL call no: QL55.N66

Descriptors: nonmammalian, models, pisces, gnathostomota, *Oryzias latipes*, carcinogenesis, neural regeneration.

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Descriptors: hormone, gonad, *In vitro*, chemical regulation.

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Descriptors: steelhead, fish, cardiovascular disease, reproduction, growth, movement, behavior, carcinogens, tumors, parasites.

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Descriptors: euthanasia, anesthesia, analgesia, sampling capture, IACUC, restraint, radiotelemetry, radioisotopes, housing, maintenance, release.

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Descriptors: circulatory fluid, blood, plasma, osmotic composition, osmotic relations, temperature relationships, thermal acclimation, plasma ionic concentration, environmental factors, physical environment.

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Descriptors: levels, baseline, trauma, post-operative, sampling.

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Descriptors: metal stress, antagonistic, synergistic, bioaccumulation, mortality, cellular, pollution, liver enzyme catalase, toxicity.
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Descriptors: similarities, neurotransmission, parasympathetic, sympathetic, transmitters, adrenoceptors, catecholamines.
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Descriptors: responses, hypoxia, heavy metals, pollution.
- Reproduction in fish experiencing acid and metal stress.** Peterson, R.H.; Daye, P.G.; Lacroix, G.L. and Garside, E.T. *Acid Rain/Fisheries: Proceedings of an International Symposium on Acidic Precipitation and Fishery Impacts in Northeastern North America, Cornell University, Ithaca, NY; August 2-5, 1981* Johnson, R.E. (ed.), American Fisheries Society, Bethesda, MD; 1982, pp. 177-196.
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Descriptors: ricefish, biology, husbandry, environmental conditions, reproduction, spawning, diet, cleaning, health, hatching, rearing, oviparous, development, toxicity.

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Descriptors: piscine hemogram, leukocytes, blood collection, hematologic evaluation, diagnostic tool.

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Descriptors: restraint, environmental stimuli, bradycardia, forebrain, midbrain, hindbrain, physiology, habituation.

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Descriptors: effective concentrations, water temperature, water hardness, handling, recovery, water quality, fish size.

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Descriptors: water level, filters, green swordtails, mosquitofish, ammonia concentration, nitrate concentration.

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Descriptors: heart, hemodynamics, aqueous environment.

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- Using fish as models in biomedical research.** May, E.B.; Bennett, R.D.; Lipsky, M.M. and Reimschuessel, R. *Lab Animal*, v.16 (4), p. 23-28 (1987).
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 Descriptors: cephalaspidomorphi, chondrichthyes, osteichthyes, salmondia, cycle, design, filtration, water quality, construction.
- Anesthesia for fish.** Sedgwick, C.J. *The Veterinary Clinic of North America: Food Animal Practice*. W.B. Saunders Co., Philadelphia, PA; v.2 (3), p. 737-742 (1986).
 NAL call no: SF601.V535
 Descriptors: handling, examination, diagnostic sampling, transport, sedation, techniques, biology.
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Descriptors: ichthyology, non-teleostean fishes, tetrapods, hagfishes, lampreys, agnathans, teleosts, composition, lymph, water balance.

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Descriptors: freshwater fish, response, ion-osmotic shock, phosphorylate, transhydrogenase, salinity adaption, calcium uptake.

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Descriptors: channel catfish, golden skinners, LC50, induction, recovery, water hardness, pH, opercular movement, survival, exposure time.

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Descriptors: ethyl-1-methylbenzoyl-imidazole-5-carboxylate, non-barbiturate, hypnotic agent, golden skins, channel catfish, sedation.

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NAL call no: 414.9 J274

Descriptors: sedation, transport, handling, sodium bicarbonate, sulphuric acid, suitability, safety, labor intensive, effectiveness.

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Descriptors: plasma cortisol, urea stress, mannitol stress, response, intoxication, pituitary-interrenal axis, hypophysectomized, acclimation.

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Descriptors: necrotic gill damage, mortality, oogenesis, pH toxicity.

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NAL call no: 414.9 J274

Descriptors: transportation, anesthetic, reduced stress, CO₂.

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Descriptors: anesthesia, effects, transport, handling, care.

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Descriptors: catecholamines, stress actions, physiologic parameters.

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Descriptors: laboratory animals, fish culture, shellfish culture.

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Descriptors: dissolved oxygen, rainbow trout, salmonid farming, nephrocalcinosis.

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Descriptors: regulation, endocrinology, effects, pollution, temperature, anaesthesia, handling.

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Descriptors: terminology, stress responses, relevance.

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Descriptors: skin, mucous, blood, fever.

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Descriptors: hypothalamus, pituitary, interrenal, hypothalamic-pituitary-interrenalaxis, HPI axis, stress evaluation response.

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Descriptors: components, stress conceptualization, stress control.

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Descriptors: hormones, immunosuppressive factors, macrophages, temperature, antibiotics.

Stress, environment and reproduction in teleost fish. Billard, R.; Bry, C. and Gillet, C. In: *Stress and Fish*. Pickering, A.D. (ed.), Academic Press, London, England, 1981, pp. 185-208.

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Descriptors: photoperiod, water quality, synergism, mechanisms.

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Descriptors: surgical technique, humane care and use, animal rights.

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Descriptors: housing, stress, handling, analgesia, guidelines.

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Descriptors: selection, methods, guidelines, suitability, technique.

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Descriptors: dosages, antifungal, antibacterial, recommendations, guidelines.

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Descriptors: spawning periodicity, fathead minnow, thermal limit, oogenesis.

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Descriptors: sedation, quantity calculation, method of induction, benefits.

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Descriptors: anesthesia, benzocaine, dosages, temperature, recommendations, recovery.

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Descriptors: thrombocytes, lymphocytes, immunity, monocytes, macrophages, morphology, mastcells, eosinophils.

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Descriptors: cell-mediated immunity, humoral antibody system.

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Descriptors: lab animal, standards, use, handling, growth, maintenance.

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Descriptors: normal values, blood sampling.

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Erythrocyte counts and hemoglobin content in nine species of marine teleosts. Eisler, R. *Chesapeake Science*. Maryland Department of Research and Education, Chesapeake Biological Laboratory, Solomon, MD; v. 6 (2) p. 119-120 (1965).
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Descriptors: mean length, erythrocyte number, hemoglobin content

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Descriptors: reptiles, drug therapy, antibiotics.

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Descriptors: reptiles, clinical examination.

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Descriptors: *Crocodylus*, growth rate, length, data collection.

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Descriptors: iguana, growth, diet, dry matter, crude fiber, crude protein.

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Descriptors: reptiles, animal welfare.
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Descriptors: constrictor, python, boidae, liver, biopsy, ultrasound, histology.

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Descriptors: captive reptiles, parasites, control, handbooks.

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Descriptors: virus, bacteria, nematodes.

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Descriptors: welfare, guidelines, policy.

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NAL call no: SF605.A4

Descriptors: Reptilia, Amphibia, anesthesia, euthanasia.

Biomedical and Surgical Aspects of Captive Reptile Husbandry. Frye, F.L. Krieger Publishing Company, Malabar, FL; 2 vol., 1991, 637 pp.

NAL call no: SF997.5.R4F78 1991

Descriptors: physiology, pathology, prevention, anatomy, post-operative care, anesthesia.

Cage design and configuration for arboreal reptiles. Mason, R.T.; Hoyt, Jr., R.F.; Pannell, L.K.; Wellner, E.F. and Demeter, B. *Laboratory Animal Science*, v. 41 (1), p. 84-86 (1991).

NAL call no: 410.9 P94

Descriptors: policy, biophysics, housing, environment.

Diagnosis and treatment of infertility in captive alligators. Cardeilhac, Paul. Florida Dept. of Agriculture & Consumer Services, 1991, 40 p., ill.

NAL call no: SF515.5.A44C37 1991

Descriptors: alligator, infertility, diagnosis, treatment.

Energy requirements for maintenance and growth of wild mammals, birds and reptiles in captivity. Kirkwood, J.K. *The Journal of Nutrition*, v. 121(Suppl.11), p. S29-34 (1991).

NAL call no: 389.8 J82

Descriptors: obesity, anorexia, feeding neonates.

Husbandry and clinical evaluation of *Iguana iguana*. Anderson, N.L. *Compendium on Continuing Education for the Practicing Veterinarian*, v. 13 (8), p. 1265-1272 (1991).

NAL call no: SF601.C66

Descriptors: husbandry, exam, diagnosis, treatment, thermoregulation, dietary needs.

Medical management of reptile patients. Jenkins, J.R. *The Compendium on Continuing Education for the Practicing Veterinarian*, v. 13 (6), p. 980-983, 988 (1991).

NAL call no: SF601.C66

Descriptors: pathology, preventative medicine.

A Practical Guide for Feeding Captive Reptiles. Frye, F.L. Krieger Publishing Company, Malabar, FL; 1991, 171 pp.

NAL call no: SF515.F79 1991

Descriptors: health, nutrition, diet.

Prescribing for reptiles. Debuf, Y.M. (ed.), In: *The Veterinary Formulary: Handbook of Medicines Used in Veterinary Practice.* The Pharmaceutical Press, London, England; 1991, pp. 43-45.

NAL call no: SF916.5.V37 1991

Descriptors: antibiotics, dosages, parasites.

Reciprocal changes in corticosterone and testosterone levels following acute and chronic handling stress in the tree lizard, *Urosaurus ornatus*. Moore, M.C.; Thompson, C.W. and Marler, C.A. *General and Comparative Endocrinology*, v. 81 (2), p. 217-226 (1991).

NAL call no: 444.8 G28

Descriptors: handling, captivity.

Recommendations for the care of amphibians and reptiles in academic institutions. Pough, F.H. *ILAR News*. National Academy Press, Washington, DC; 33(4):S1-S21 (1991).

NAL call no: QL55.A1I43

Descriptors: breeding, housing, marking, care, photoperiod, thermoregulation.

A review of anesthesia and chemical restraint in reptiles. Bennett, R.A. *Journal of Zoo and Wildlife Medicine*, v. 22 (3), p. 282-303 (1991).

NAL call no: SF601.J6

Descriptors: pre-anesthetics, local, injectable, hypothermia, inhalants, electro anesthesia.

The Snakes of Thailand and Their Husbandry. Cox, M.J. Krieger Publishing Company, Malabar, FL; 1991, 526 pp.

NAL call no: SF515.5.S64C68 1991

Descriptors: housing, breeding, feeding.

A technique to anesthetize turtles with ether. Bello, A.A. and Bello-Klein, A. *Physiology and Behavior*, v. 50 (4), p. 847-848 (1991).

NAL call no: QP1.P4

Descriptors: cannula, pump, ether.

Use of oxytocin to induce oviposition in a dystocic saltwater crocodile (*Crocodylus porosus*).

Carmel, B.P. *Australian Veterinary Journal*. Brunswick, Victoria: Australian Veterinary Association. Jun.1991, v. 68 (6), p. 216-217. ISSN: 0005-0423.

NAL call no: 41.8 AU72

Descriptors: crocodylus, oxytocin, dystocia, oviposition.

Husbandry and Preventative Medicine Practices that Increase Reproductive Efficiency of Breeding Colonies of Alligators. Cardeilhac, P. Florida Dept. of Agriculture and Consumer Services, Tallahassee, FL; 1990, 47 pp.

NAL call no: QL666.C929C37

Descriptors: housing, diet, propagation.

Growth rate and plasma corticosterone levels in juvenile alligators maintained at different stocking densities. Elsey, R.M.; Joanen, T.; McNease, L. and Lance, V. *Journal of Experimental Zoology*, v. 255 (1), p. 30-36 (1990).

NAL call no: 410 J825

Descriptors: stress, juveniles, crowding.

A Step-by-step Book About Iguanas. Harris, J.C., T.F.H. Publications, Neptune City, NJ; 1990, 64 pp.

NAL call no: SF459.I38H37

Descriptors: housing, breeding, feeding, nutrition, maintenance.

Stress in reptiles. Lance, V.A. In: *Progress in Comparative Endocrinology: Proceedings of the Eleventh International Symposia on Comparative Endocrinology held in Malaga, Spain, May 14-20, 1989.* August, E.; Scanes, C.G. and Stetson, M.H. (eds.), Wiley-Liss, Inc., New York, NY; 1990, pp. 461-466.

NAL call no: QP187.A1152 1989

Descriptors: handling, crowding, physiology.

Alligator Aquaculture in the South. Rollason, S. Louisiana Cooperative Extension Service, Baton Rouge, LA; videocassette (18 min.), 1989.

NAL call no: Videocassette no. 966

Descriptors: care of hatchlings, incubation, transport, feed.

- Ketamine as an anesthetic for some squamate reptiles.** Font, E. and Schwartz, J.M. *Life Sciences*, v. 2, p. 484-486 (1989).
NAL call no: 442.8 L62
Descriptors: colubrids, iguanids, chloroform.
- Reptilian surgery part I. Basic principles.** Bennett, R.A. *Compendium on Continuing Education for the Practicing Veterinarian*, v. 11 (1), p. 10-21 (1989).
NAL call no: SF601.C66
Descriptors: skin wounds, aseptic techniques, anatomical variation, anesthetics.
- Reptilian surgery part II. Management of surgical diseases.** Bennett, R.A. *Compendium on Continuing Education for the Practicing Veterinarian*. Princeton Jct., NJ; v.11 (2), p. 122-133.
NAL call no: SF601.C66
Descriptors: bacterial infections, wound healing, celiotomy, gastrointestinal abnormalities, treatments.
- Evaluation of the reptile patient.** Jacobson, E.R. *Contemporary Issues in Small Animal Practice*, v. 9, p. 1-18 (1988).
NAL call no: SF601.C64
Descriptors: behavior, maintenance, care.
- Hospital care of the reptile patient.** Jarchow, J.L. *Contemporary Issues in Small Animal Practice*, v. 9, p. 19-34 (1988).
NAL call no: SF601.C64
Descriptors: post-operative care, maintenance, analgesia, anaesthesia.
- Husbandry and Preventative Medicine Practices That Increase Reproductive Efficiency of Breeding Colonies of Alligators.* Cardeilhac, P. Florida Department of Agriculture and Consumer Services, Tallahassee, FL; 1988.
NAL call no: SF459.A4C3
Descriptors: reproduction, maintenance, pathology.
- Keeping and Breeding Snakes.* Mattison, C. Sterling Publishing Co., New York, NY; 1988, 183 pp.
NAL call no: SF515.5.S64M38
Descriptors: husbandry, maintenance, environment, feeding, diseases.
- Practical Methodology Reptiles.* Mader, D.R. University of California at Davis, School of Veterinary Medicine, Davis, CA; 1988, 2 videocassettes, VHS, 35 minutes.
NAL call no: Videocassette no.414
Descriptors: euthanasia, handling, care.
- Use of chemotherapeutics in reptile medicine.** Jacobson, E.R. *Contemporary Issues in Small Animal Practice*, v. 9, p. 35-48 (1988).
NAL call no: SF601.C64
Descriptors: methods, pathology, treatment.

Handbook on the Maintenance of Reptiles in Captivity. Welch, K.R.G. Krieger Publishing Co., Malabar, FL; 1987, 156 pp.
NAL call no: QL665.W4 1987
Descriptors: care, husbandry, feeding.

Snakes & Lizards: Their Care and Breeding in Captivity. Coborn, J. Newton Abbott Publishing, English, 1987, 208 pp.
NAL call no: SF515.5.L58C63 1987
Descriptors: husbandry, environment, maintenance.

The UFAW Handbook of the Care and Management of Laboratory Animals. Poole, T.B. Bath Press, Avon, Great Britain, 1987, pp. 716-752.
NAL call no: QL55.U5 1987
Descriptors: reptiles, amphibia, fish, environment.

Euthanasia of reptiles. Warwick, C. 1985. *Journal of the American Veterinary Medical Association*, v. 187 (11), p. 1081. ISSN: 0003-1488.
NAL call no: 41.8 AM3
Descriptors: Reptilia, serpentes, sauria, testudines, euthanasia.

Euthanasia of tortoises. Godfrey, C. 1985. *The Veterinary Record*, v. 116, p. 139. ISSN: 0042-4900.
NAL call no: 41.8 V641
Descriptors: Reptilia, testudines, tortoise, euthanasia.

Anesthetic and sedative drug dosage - amphibians and reptiles. Canadian Council on Animal Care. *Guide to the Care and Use of Experimental Animals.* Canadian Council on Animal Care, Ottawa, Ontario, 1984, v. 1, pp. 99.
NAL call no: SF406.C36
Descriptors: primary agent, dose, route.

Antimicrobial drug dosage - reptiles, fish. Canadian Council on Animal Care. *Guide to the Care and Use of Experimental Animals.* Canadian Council on Animal Care, Ottawa, Ontario, 1984, v. 1, pp. 102.
NAL call no: SF406.C36
Descriptors: penicillin G, chloramphenicol, erythromycin, streptomycin.

Diseases of Amphibians and Reptiles. Hoff, G.L.; Frye, F.L. and Jacobson, E.R. Plenum Press, New York, NY; 1984, 784 pp.
NAL call no: SF997.5.A45D57
Descriptors: pathology, medicine, prevention, diagnosis.

Reptiles. Canadian Council on Animal Care. In: *Guide to the Care and Use of Experimental Animals.* Ottawa, Canada, v. 2, 1984, pp. 19-28.
NAL call no: SF406.C36
Descriptors: housing, nutrition, health care, restraint.

Parasites of American alligators (*Alligator mississippiensis*) in south Florida. Cherry, R.H.; Ager, A.L. Jr. *Journal of Parasitology*. Lawrence: American Society of Parasitologists. Jun. 1982, v. 68 (3), p. 509-510. ISSN: 0022-3395.
NAL call no: 448.8 J824
Descriptors: Florida, alligators.

Diseases of the Reptilia. Cooper, J.E. and Jackson, O.F. Academic Press, New York, NY; 1981, 2 volumes.
NAL call no: SF997.5.R4D57
Descriptors: pathology, parasitology, prevention, epidemiology, treatment.

Investigatory behavior in snakes, II: Cage cleaning and the induction of defecation in snakes. Chiszar, D.; Wellborn, S.; Wand, M.A.; Scudder, K.M. and Smith, H.M. *Animal Learning and Behavior*, v. 8, p. 505-510 (1980).
Descriptors: housing, maintenance, substrate, captivity.

Reproductive Biology and Diseases of Captive Reptiles. Murphy, J.B. and Collins, J.T. (eds.), Society for the Study of Amphibians and Reptiles, Oxford, OH; 1980, 277 pp.
NAL call no: QL669.3.R4
Descriptors: Congresses, pathology, herpetology, seasonality, territoriality.

Temperature and light requirements of captive reptiles. Regal, P.J. In: *Reproductive Biology and Diseases of Captive Reptiles*. Murphy, J.B. and Collins, J.T. (eds.), Society for the Study of Amphibians and Reptiles, 1980, pp. 79-91.
NAL call no: QL669.3.R4
Descriptors: ectothermy, maintenance, thermoregulation.

Establishment and maintenance of colonies of parthenogenetic whiptail lizards. Townsend, C.R. *International Zoo Yearbook*, v. 19, p. 80-86 (1979).
NAL call no: QL76.I5
Descriptors: housing, feeding, temperature.

Laboratory maintenance. Campbell, H.W. and Busack, S.D. In: *Turtles: Perspectives and Research*. Harless, M. and Morlock, H. (eds.), Wiley Publishing, New York, NY: 1979, pp. 109-125.
Descriptors: care, husbandry, nutrition.

A Review of Marking Techniques for Amphibians and Reptiles. Ferner, J.W. Society for the Study of Amphibians and Reptiles, Miscellaneous Pubs., Herpetological Circular No. 9, 1979.
NAL call no: QL60.5.F4
Descriptors: identification, methodology.

Reptiles: Bacterial Diseases of Captive Reptiles. Frye, F.L. Health Sciences Learning Resources Center, University of Washington, Seattle, WA; 1975, 55 slides, 1 sound cassette.
NAL call no: Slide no.222
Descriptors: handling, pathology, medicine, microorganisms, herpetology.

Reptilian Disease Recognition and Treatment. Dobbs, J.S. Curtis Books, Hollywood, FL;
1973, 42 pp.
NAL call no: SF997.5.R4D6
Descriptors: pathology, diagnosis, prevention.

The Temperature and Water Relations of Reptiles. Cloudsley-Thompson, J.L. Mero
Publishing Co., Watford, Herts, England, 1971, 159 pp.
NAL call no: QL669.C63
Descriptors: ectothermy, maintenance, physiology, rhythmicity.

INFORMATION RESOURCES

AMPHIBIANS & REPTILES

African Clawed Frog Care Sheet

<http://gto.ncsa.uiuc.edu/pingleto/xenopus.html>

Information and care of the African Clawed Frog

Alexander Koenig Zoological Research Institute & Zoological Museum.

Library, Adenaueralle 160, 53113 Bonn, Germany.

Tel: 49-228-9122217; Fax: 49-228-216979

e-mail: t.bades.zfmk@uni-bonn.de

<http://www.uni-bonn.de/museumkoenig/>.

Subjects: birds, fish, zoology, fisheries, reptiles, mammals, insects. 140,00 books and bound periodical volumes.

American Society of Ichthyologists & Herpetologists (ASIH)

<http://199.245.200.110/>

Scientists, educators, students, and others interested in the study of reptiles, amphibians and fishes. Publications: *Copeia* (quarterly). Also leaflets on career opportunities.

Amphibia

http://www.biosis.org/zrdocs/zoolinfo/grp_amph.htm

General, Anura frogs, toads, Caudata salamanders, newts, Gymnophiona caecilians.

Links to information on various species.

Amphibian & Reptile Care & Handling

http://researchnet.asu.edu/animal_care/animal_information/amphibian_info.html

Handling, restraint, sexing, breeding, behavior, water, anesthesia and euthanasia.

Amphibians: Guidelines for the breeding, care and management of laboratory animals

<http://www.nap.edu/html/amphibian/preface.html>

As stated.

Amphibian Information Website, U.S. Geological Service

<http://monitoring2.pwrc.nbs.gov/amphibs/>

Patuxent Wildlife Research Center, National Park Service & Environmental Protection Agency searchable database.

Amphibia Web

<http://elib.cs.berkeley.edu/aw/resources/biology.html>

Amphibian biology resources, Amphibian web database, Amphibian lists and more.

Anapsid.org

<http://www.anapsid.org>

Reptile & Amphibian information collections. Cyclura research information, Herp care information, Iguana care information, Herp societies and reptile veterinarians.

Bibliography, captive care, health and behavior, feeding, breeding, illness & injury.

Animal Welfare Information Center, USDA, NAL

10301 Baltimore Blvd., Room 205

Beltsville, MD 20705

Tel: 301-504-6212

Fax: 301-504-7125

e-mail: awic@nal.usda.gov

<http://www.nal.usda.gov/awic>

Can provide information, literature searches, workshops, and referrals related to animals used in biomedical research exhibition. Publications: *AWIC Bulletin* (twice a year); bibliographies and information publications.

Aquatic Research Institute (ARI)

2242 Davis Court

Hayward, CA 94545

Tel: 415-785-2216

Publications: *Aquaculture* (quarterly); *Aquatica* (periodic); *Special Reports* (periodic).

ASFA (Aquatic Sciences & Fisheries Abstracts) Aquaculture Abstracts

United Nations Department of International Economic & Social Affairs

Food & Agriculture Organization

Rome, Italy and Cambridge Scientific Abstracts, Bethesda, MD.

Publications: *ASFA Aquaculture Abstracts* NAL Call no: SH135.A8

Association of Amphibian & Reptile Veterinarians (ARAV)

<http://www.arav.org>

Grants, Journal of Herpetological Medicine & Surgery, miscellaneous publications.

Australian Herpetological Directory

<http://www.jcu.edu.au/school/tbiol/zoology/herp/herp2.html>

A repository for information on Australian herps and herpetological research.

Biodiversity & Biological Collections Web Server

<http://biodiversity.bio.uno.edu/>

Searchable resources on many species and fields; import/export regulations and more.

Biol.net: Amphibians

<http://biol.net/Amphibians.htm>

Lots of information, resources and links for amphibians.

Bush Herpetological Supply

P.O. Box 539

Neodesha, KS 66757

Tel: 1-800-451-6178

<http://www.bushherp.com>

Equipment and supplies for herps.

Calculating Drug Dosages for Reptiles

<http://www.leaplizard.com/articles/dosage.html>

A good article on calculating drug dosages for reptiles by Marcia Rybak & Stephen L. Barten.

Care and Handling of *Xenopus laevis*

<http://www.ahsc.arizona.edu/uac/iacuc/xenopus/xenopus.shtml>

This site is full of useful information.

Care Sheets

<http://reptiles2000.8k.com/caresheets>

Information on the care of lizards, snakes, turtles, frogs, toads, salamanders & newts.

Care Sheets for Snakes

<http://is.rice.edu/~shel/Herp/snake.care.html>

Good information on the care, housing, feeding, parasites, diseases and breeding of snakes.

Carolina Biological Supply Company

2700 York Road

Burlington, NC 27215-3398

Tel: 1-800-334-5551

Fax: 1-800-374-6714

<http://www.carolina.com>

Supplier of various species of fish, amphibians and reptiles.

Care and Use of *Anolis carolinensis* in the Lab

<http://www.bio.utk.edu/Neils.nsf/d8562c8c8efe0a2c852563ef0047cd59/136845d1d67ff9d58525646000615b71?OpenDocument>

Information of the care and use of lizards in the lab. Handling references. Additional lizard information under Animal Husbandry and Welfare.

Category Based Herpetological Web Index

<http://herpetology.com/webdata.hts>

Index of herpetologic web sites by category.

Cell and Developmental Biology Online

<http://www.uoguelph.ca/zoology/devobio/linksbio.htm>

Lots of good information and links for amphibians and zebra fish, information network.

Center for North American Herpetology (CNAH)

<http://www.naherpetology.org/>

Information and links for North American herps.

Chelonian Research Foundation

<http://www.chelonian.org>

Turtle & tortoise conservation and biology; Newsletters; research monographs; research awards; research institution.

Chicago Herpetological Society

2060 North Clark Street

Chicago, IL 60614

<http://www.chicagoherp.org>

Publications: periodic bulletins. Funding source for research on reptiles and amphibians.

Cold Blooded Vertebrates as Animal Models

<http://www.ahsc.arizona.edu/uac/notes/classes/coldblood98/coldbldverteb98.htm>

Basic information on cold blooded vertebrates as animal models, plus information on animal welfare laws and guidelines, zoonoses, permits and licenses. With references.

Colorado Herpetological Society's Internet Resources Guide

<http://www.coloherp.org/herplink/herporgs.html>

An Internet herp resource guide.

Crocodile Specialists Group

<http://www.flmnh.ufl.edu/natsci/herpetology/crocs.htm>

Conservation; newsletter; publications; photo gallery.

Digital Frog International

<http://www.digitalfrog.com/>

Biology; ecology; software; dissection.

Duke University Marine Laboratory

Privers Island

135 Duke Marine Lab Road

Beaufort, NC 28516-9721

Tel: 252-504-7503

Fax: 252-504-7648

<http://www.env.duke.edu/marinelab/>

Marine and freshwater biomedical sciences center specializing in biochemical toxicology.

Dutch Herpetological Society *Lacerta*

<http://www.xs4all.nl/~lacerta/>

English and Dutch; study and specialists groups; terrarian animal husbandry techniques.

Publications: Journal *Lacerta* 6 times/year; newsletter monthly.

NAL Call no: QL640.L3.

Eco Universe Herpetological Publishing & Distribution

915 Seymour Ave.

Lansing, MI 48906

Tel: 517-487-5595

Fax: 517-371-2709

<http://www.ecouniverse.com/1999index.html>

An all reptile magazine index.

The EMBL Reptile Database

European Molecular Biology Laboratory, Meyerhofstr. 1, D-69117 Heidelberg, Germany.

Provides scientific information on the classification of reptile species.

Tel: 49-6221-3870; Fax: 49-6221-387306

<http://www.embl-heidelberg.de/~uetz/LivingReptiles.html>

Searchable database; historic papers online; CD available. Lizards, snakes, turtles, amphibians, crocodiles, tuataras.

Embryology Tutorials for Zebra Fish, Amphibians & Echinoderms for Undergraduates
http://worms.zoology.wisc.edu/embryology_main.html
As stated.

Feeding Exotics Part III: Reptiles
<http://education.vetmed.vt.edu/Curriculum/VM8264/07c/>
Information on diets, feeding and deficiencies.

Fluid & Fluid Therapy in Reptiles
<http://www.sonic.net/~melissk/fluids.html>
Good information on fluid therapy in reptiles including administration of oral and injectable medications and fluid requirements for reptiles, plus references.

Frank & Kates Herpetological Web Page
<http://www.halcyon.com/slavens/>
Long-term maintenance and breeding information.

Fund for the Replacement of Animals in Medical Research (FRAME)
Russell & Burch House
96-98 North Sherwood Street
Nottingham NG1 4EE, England
Tel: (0) 115 950 4740
Fax: (0) 115 950 3570
e-mail: frame@frame.org.uk
<http://www.frame.org.uk>
Publications: *Alternatives to Laboratory Animals*.

Guidelines for the Use of Live Amphibians & Reptiles in Field Research
<http://199.245.200.110/pubs/herpcoll.html>
As it states.

Hematology Bibliography
<http://www.azvt.org/hemo.htm>
A hematology bibliography for various species.

Herpetological Contents - Herplit Database
Bibilomania
P.O. Box 58355
Salt Lake City, UT 84153-9355
Tel/Fax: 1-800-453-0489
<http://www.herplit.com/contents/>
Searchable database with about 50,000 herp publications.

The Herpetologists' League
<http://www.inhs.uiuc.edu/cbd/HL/HL.html>
Publications: *Herpetologica* Journal (quarterly).
Herpetological Monographs (annually).
HL Communications (Newsletter bi annually).
Research articles, essays, symposia, etc., links.

Herpetological Society Listing

<http://www.onrampinc.net/mhs/herpsoc.htm>

Listing of various society and organization web sites.

Herp Web and Database

<http://herpetology.com>

Reptile and amphibian books and reviews, herpetology, links and more.

Houston Herpetological Supply

<http://www.houstonherp.com/>

Snakes, frozen mice and rats, info for hobbyists.

Infectious Diseases of Reptiles

<http://nersp.nerdc.ufl.edu/~iacuc/infectiousdis.htm>

Information on infectious diseases of reptiles.

Interactive Frog Dissection

<http://curry.edschool.virginia.edu/go/frog>

As stated.

Internet Resource Guide for Zoology

http://www.biosis.org/zrdocs/zoolinfo/grp_rept.htm

Information and links for amphibians, crocodiles, dinosaurs, lizards, snakes, turtles, tortoises, etc.

Institute of Laboratory Animal Resources (ILAR)

National Academy of Sciences

2101 Constitution Ave. N.W.

Washington, D.C. 20418

Tel: 202-334-2590

Publications: *ILAR News* (quarterly).

Animals for Research: A Directory of Sources (suppliers).

International Reptiles & Amphibians Web Site Directory

<http://www.xmission.com/~gastown/herpmed/>

A good listing of web sites.

International Reptile Breeders Association

P.O. Box 85152-279

San Diego, CA 92186

Tel: 619-445-9966

Fax: 619-445-9904

<http://www.irba.com/>

Events, links, shows.

International Zoo Yearbook

Zoological Society of London

London, England

1959-present

Publications: *International Zoo Yearbook* NAL Call no: QL76.I5.
Contains sections on care, breeding and exhibition of zoo and aquarium animals.

Jason's Snakes & Reptiles

<http://www.snakesandreptiles.com/>

Care sheet for snakes, information, CD titles, links.

Journal of Developmental Biology

<http://www.ijdb.ehu.es/welcome.html>

Journal articles from the Society for Developmental Biology.

Museum of Comparative Zoology

Harvard University, 26 Oxford Street, Cambridge, MA 02138. Tel: 617-495-2460; Fax: 617-496-8308; e-mail: jmccarthy@mcz.harvard.edu

<http://www.oeb.harvard.edu>

Publications: *Brevoria* (occasionally); *Bulletin* (occasionally); Check List of Birds of the World; *Johnsonia* (Mollusks).

Museum of Zoological Publications

1109 Geddes Road, Ann Arbor, MI 48109-1079; Tel: 734-764-0476; Fax: 734-763-4080; e-mail: Fpaper@umich.edu

<http://www.ummz.lsa.umich.edu/>

Select Resources and then Publications: Occasional Papers; Miscellaneous Publications on birds, fishes, insects, mammals, mollusks, reptiles, and amphibians.

National Museum of Natural History

Smithsonian Institution.

Department of Invertebrate Zoology

Washington, D.C. 20560-0163

Tel: 202-786-2076

Fax: 202-357-3043

<http://www.mnh.si.edu>

NetVet Amphibians

<http://netvet.wustl.edu/amphib.htm>

Lots of good information and links on amphibians.

NetVet Reptiles

<http://netvet.wustl.edu/reptiles.htm>

good information of reptiles.

NHP Registry

<http://www.abbipets.com/NHR/nhr.html>

Herp species information.

NIH Xenopus Initiative Website

<http://www.nih.gov/science/models/xenopus/>

Progress and plans, needs for research, meetings, publications, funding opportunities, resources.

An Overview of the Use of Reptiles in Research/Teaching

<http://nersp.nerdc.ufl.edu/~iacuc/reptile.htm>

As stated.

Recommendations for the Care of Amphibians & Reptiles in Academic Institutions

<http://hayato.med.osaka-u.ac.jp/index/guide/inform/regulation/usadocs/pough.txt>

<http://netvet.wustl.edu/species/reptiles/pough.txt>

Reptiles: <http://netvet.wustl.edu/reptiles.htm>

Amphibians: <http://netvet.wustl.edu/amphib.htm>

Reptile & Amphibian Magazine

RD3, Box 3709

Pottsville, PA 17901

1989-present.

Publications: Quarterly. Articles on husbandry methods, advertisements from equipment and animal suppliers.

Reptile, Amphibian Medicine and Veterinary Books

<http://herpetology.com/medbooks.html>

Find your books and order through Amazon.com.

Reptile & Amphibian Resource & Herpetological Information Online

<http://www.petwarehouse2.com/herpshabitat/community.asp>

Information, FAQ's, equipment, sales.

Reptiles

Fancy Publications, P.O. Box 6050, Mission Viejo, CA 92690. Tel: 949-855-8822,

Toll-free: 800-365-4421; Fax: 949-855-3045. Monthly. ISSN: 1068-1965.

Reptile Resources

<http://www.lib.duke.edu/bes/reptiles/>

Species data, herpetological resources, databases, general biological websites and more.

Rules for Using Reptiles in Research & Teaching

<http://nersp.nerdc.ufl.edu/~iacuc/reptilelaws.htm>

Information, laws and requirements for using reptiles in research.

Salamandra

Deutsche Gesellschaft für

Herpetologie und Terrarienkunde

Frankfurt am Main, Germany

1965-present

Publications: *Salamandra* NAL Call no: QL640.S3.

Scientists Center for Animal Welfare (SCAW)

7833 Walker Drive, Suite 410

Greenbelt, MD 20770

Tel: 301-345-3500

Fax: 301-345-3503

e-mail: info@scaw.com

<http://www.scaw.com>

Purpose: conferences, publications, educational materials on animal welfare.

Publications: Quarterly newsletter, conference proceedings.

The Care and Use of Amphibians, Reptiles, and Fish in Research.

Society for the Study of Amphibians & Reptiles (Herpetology) (SSAR)

<http://www.ukans.edu/~ssar/SSAR.html>

Purpose: education, conservation, research and grants.

Publications: *Herpetological Circulars* (annual).

Herpetological Review (quarterly) NAL Call no: QL640.H47

Journal of Herpetology (quarterly) NAL Call no: QL640.J6

Also publishes books, reprints, and brochures.

Thermoregulatory Consequences of Transmitter Implant Surgery in a Small Lizard

<http://www.npwrc.usgs.gov/resource/tools/telemetry/thermreg.htm>

As stated.

Universities Federation for Animal Welfare

The Old School, Brewhouse Hill

Weathamstead, Hertfordshire AL4 8AN

Tel: 1582 831818

Fax: 1582 831414

e-mail: ufaw@ufaw.org.uk

<http://www.ufaw.org.uk>

Publications: *The UFAW Handbook on the Care and Management of Laboratory Animals.*

NAL Call no: QL55.U5 1987.

The UFAW Handbook on the Care and Management of Cephalopods in the Laboratory.

NAL Call no: SF407.M37B68.

UNSW Embryology: Frog Development

<http://anatomy.med.unsw.edu.au/cbl/embryo/OtherEmb/Frog.htm>

Also information of the fly, worm, zebra fish, rat, mouse, chicken, and rabbit.

Useful References on Reptile and Amphibian Captive Breeding and Biology

<http://www.angelfire.com/al/repticare/page18.html>

A list of references on captive breeding and biology of reptiles and amphibians.

The Virtual Embryo

<http://www.ucalgary.ca/UofC/eduweb/virtualembryo/>

Research & learning resources, tutorial, virtual library and a modular resource to facilitate learning in developmental biology.

The Vivarium Magazine

American Federation of Herpetoculturists (AFH).

1924 Mission Road, Suite N

Escondido, CA 92092

<http://www.vivarium.com>

Publications: *The Vivarium Magazine.*

Guidelines, magazine, herp care and information database, veterinary directory, etc.

What is a Healthy Reptile?

<http://nersp.nerdc.ufl.edu/~iacuc/hlthyrep.htm>

Information on what is a healthy reptile and how to keep them that way.

A Whole-Animal Alternative Model for Pain Research

<http://www.nal.usda.gov/awic/newsletters/v8n3/8n3steve.htm>

Whole animal model alternative and references.

World-Wide-Web Virtual Library - Herpetology

<http://cmgm.stanford.edu/~meisen/herp/>

Resources, information, meetings, organizations, academic institutions, and more.

Xenopus Express

<http://www.xenopus.com>

Suppliers, care and feeding, database.

Xenopus tropicalis

<http://minerva.acc.virginia.edu/%7Edevelbio/trop/>

Amphibian Model for Vertebrate Development Genetics. Lots of good information.

Xenopus laevis Frog Colony Care

<http://www.xlaevis.com>

A lot of information on Xenopus colony care.

FISH

American Fisheries Society (ASF).

5410 Grosvenor Lane

Bethesda, MD 20814-2199

Tel: 301-897-8616

Fax: 301-897-8096

e-mail: main@fisheries.org

<http://www.fisheries.org>

Publications: *AFS Membership Directory and Handbook* (annual).

Fisheries: Bulletin of the American Fisheries Society (bimonthly).

Journal of Aquatic Animal Health (quarterly).

North American Journal of Fisheries Management (quarterly).

Progressive Fish Culturist (quarterly).

Transactions of the American Fisheries Society (bimonthly).

American Institute of Fisheries Research Biologists (AIFRB)

c/o Dr. Gary Sakagawa, S.W. Fisheries Science Center, P.O. Box 271,

La Jolla, CA 92038-0271. Tel: 858-546-7177; Fax: 858-546-5653

e-mail: gary.sakagawa@noaa.gov

<http://www.aifrb.org>

Publications: *Briefs* (bimonthly newsletter).

Anesthetic Options for Fish. P.R. Browser. *Recent Advances in Veterinary Anesthesia and Analgesia: Companion Animals*. R.D. Gleed; J.W. Ludders Eds.
http://www.ivis.org/advances/Anesthesia_Gleed/bowser/chapter_frm.asp?LA=1

Aquatic Research Institute (ARI)

2242 Davis Court, Hayward, CA 94545. Tel: 510-785-2216; Fax: 510-784-0945
e-mail: rofen@prado.com

Provides research materials on fish, fisheries, and aquaculture, aquatic sciences and technology. Research on fish nutrition, diseases, and aquaculture.

Aquatic Systems Consultants

1111 Winterton Street, Pittsburgh, PA 15206-1731. Tel: 412-661-6585;
Fax: 412-661-6585; e-mail: AquaDolph@aol.com

Consulting on fish and fisheries, marine biology, hydrobiology.

Aquatic Technology

<http://www.aquatictech.com/>

Saltwater aquarium equipment, information, stock and supplies.

Aqua Web Fish Resources

<http://www.aquaweb.pair.com/>

A variety of information related to fish keeping.

Cornell University

Hydroecology & Fish Biology

<http://www.dnr.cornell.edu/hydro2/hydro2.htm>

Research, ecology, publications.

Eel-like fish as models for biomedical research

<http://exn.ca/Stories/1997/02/10/12.asp>

From the Discovery channel. Information on eels as models for biomedical research.

Enrica Fish Medical Books

814 Washington Ave. SE, Minneapolis, MN 55414. Tel: 612-623-0707;

Fax: 612-623-0539; Toll-free: 800-728-8398. Distributor and wholesaler medical and technical books.

Environmental Health Perspectives: Fishing for Answers

<http://ehpnet1.niehs.nih.gov/docs/1994/102-3/niehsnews.html>

From NIEHS News. Information on fish used in research and environmental contamination.

FINS - The Fish Information Service

<http://www.actwin.com/fish/index.php>

Aquarium reference materials, FAQ's, index of fish/species, links and more.

Fish

<http://www.animalnetwork.com/fish>

A variety of topics about aquariums, aquarium library, aquarium archives, tips and trivia.

Publications: *Aquarium Frontiers On-line*.

FishBase

<http://www.fishbase.org/search.cfm>

Global information system on fishes. Has two searchable databases: FishBase and LarvalBase. Contains information on over 23,800 species. Contains common or scientific names, 109,000 common names, synonyms, pictures, references for fish and larvae.

Fish Carcinogenesis & Histopathology Facility Core

<http://www.niehs.nih.gov/centers/fac-core/orm-fac1.htm>

Oregon State University, Marine & Freshwater Biomedical Sciences Center.

Fish FAQ

<http://www.nefsc.nmfs.gov/faq/>

NMFS, Northeast Fisheries Science Center FAQ's on fish.

Fishing for answers: Fish gene map guides: the search for human genes.

<http://www.stanford.edu/dept/news/report/news/may3/fish-53.html>

From the Stanford Online Report. Gene map guides for fish.

FishLink Central.Com

<http://www.fishlinkcentral.com>

A guide to aquarium resources on the Internet.

Fish Models for Environmental Carcinogenesis: The Rainbow Trout

<http://ehpnet1.niehs.nih.gov/docs/1996/Suppl-1/bailey-abs.html>

Fish models for toxicity in the environment.

Fish Nutrition Research Lab

<http://www.uoguelph.ca/fishnutrition/main.html>

File downloads on fish feeding, nutrition, bioenergetics, publications, links, and more.

Fish & Shellfish Immunity

<http://www.vims.edu/env/research/immune.htm>

The study of immune defense mechanisms in finfish and shellfish.

Fish & Shellfish Immunology

<http://www.academicpress.com/fsi>

Journal of Fish and Shellfish Immunology on-line and searchable.

Fish~Vet2.0

<http://users.jagunet.com/~fishvet/>

Consultation services, aid in fish problem diagnosis.

Guidelines for the Use of Fishes in Field Research

<http://199.245.200.110/pubs/fishguide.html>

As stated.

Ichthyology Web Resources

<http://www.biology.ualberta.ca/jackson.hp/IWR/index.php>

On-line ichthyology resources, specimen database, links.

International Association of Fish & Wildlife Agencies

<http://www.iafwa.org/>

Publications, newsletter, Directory of state and province Fish & Wildlife Agencies and Web Sites, grant program.

Internet Resource Guide for Zoology

http://www.biosis.org/zrdocs/zoolinfo/grp_fish.htm

Aquaculture, links, resource guides, fishbase, fishes, images, zebra fish information and more.

Journal of Fish Biology

<http://www.academicpress.com/jfb>

Search issues of the journal.

<http://www.idealibrary.com/cgi-bin/links/toc/jb>

Journal of Fish Biology issues available from 1993 to 2001 On many issues.

Marine Biological Laboratory

Woods Hole, MA 02543

Tel: 508-548-3705 X7002 or 508-289-7002 (library).

Maintains extensive materials on the use of marine animals in biomedical research.

Marine/Freshwater Biomedical Sciences Center, Oregon State University, Corvallis, OR

<http://oregonstate.edu/dept/mfbcenter/>

<http://www.niehs.nih.gov/centers/res-core/orm-res2.htm>

Uses aquatic research models to investigate environmentally related human diseases.

Currently focused on the study of cancer and neurotoxicity.

Marine and Fresh Water Biomedical Science Center, Univ. of Wisconsin: Annual Reports for the MFB Sciences Center

<http://www.uwm.edu/Dept/MFB/AnnualReports/>

Research papers on fish toxicity, gene mapping, fish as disease models, neuronal patterns, cloning zebra fish, metabolism, genotype and more. Publications 1978 to present.

Netvet - Fish

<http://netvet.wustl.edu/fish.htm>

Information on fish, aquaculture, aquariums and more.

Pond Fish Care

<http://www.vetark.co.uk/Pondfish%20care.html>

Information on pond fish care and diseases.

Questions & Answers About Transgenic Fish

<http://www.fda.gov/cvm/index/consumer/transgen.htm>

Information for consumers on transgenic fish

Rosenstiel School of Marine and Atmospheric Science

University of Miami

4600 Rickenbacker Causeway

Miami, FL 33149

Tel: 305-361-4738 (Center No.).

Fax: 305-361-4001

<http://www.rsmas.miami.edu/groups/niehs/>

NIEHS funded Marine and Freshwater Biomedical Sciences Center specializing in seafood borne toxins and biochemical toxicology.

Sea Life Supply

740 Tioga Avenue

Sand City, CA 93995-3034

Tel: 831-394-0828

Fax: 831-899-3399

e-mail: info@sealifesupply.com

<http://www.sealifesupply.com>

Supplier of various marine and freshwater species.

University of Washington - Fish Collection

<http://artedi.fish.washington.edu/>

Searchable databases, collection resources, links and more.

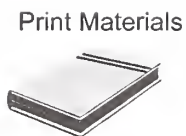
Zebrafish Research Database

<http://zfin.org>

http://zfin.org/zf_info/dbase/db.html

A great deal of information on zebrafish.

National Agricultural Library Document Delivery Services



Services Available to Individuals

The National Agricultural Library (NAL) supplies agricultural materials not found elsewhere to other libraries and information centers. Submit requests **first to your local library resources**. In the United States, possible sources are public libraries, state libraries, land-grant university or other large research libraries within a state. In other countries submit requests through major university, national, or provincial institutions.

If the publications are not available from these sources, have your library submit requests to NAL with a statement indicating their non-availability. Submit one request per page following the information below.

Information for the Library (The following information is provided to assist your librarian in obtaining the required materials.)

Interlibrary Loan Service -- Photocopies are available on interlibrary loan for a fee. Submit a separate interlibrary loan form or request for each item. If the citation is from an NAL database (AGRICOLA, *Bibliography of Agriculture*, or the NAL Catalog) and the call number is given, please include it. Willingness to pay charges must be indicated on the form. Materials in NAL's collection are loaned only to other U.S. and Canadian libraries. The following materials are not loaned: serials; rare, reference, and reserve books; microforms; and proceedings of conferences or symposia. Photocopy or microform of non-circulating publications may be requested for a fee provided that the request does not exceed 50 pages per item. Request must also include copyright compliance -- Pre-printed forms must contain your signature to indicate copyright compliance. On e-mail requests include the complete Statement of Copyright Compliance ("I have read the warning on copyright restrictions and accept full responsibility for compliance."), **your full name, date, and telephone number in each request**. Libraries may indicate compliance by including the initials of one statement, either "CCL" for compliance with the copyright law or "CCG" for compliance with Copyright Guidelines or a statement that the request complies with U.S. Copyright Law or other acceptable copyright laws (i.e. IFLA, CLA, etc.). Libraries must also provide authorizing official's name. Requests will be rejected if this information is not included.

Charges:

- Photocopy from paper, or paper copy of microfilm and microfiche for domestic delivery -- \$13.00 up to 50 pages. Photocopy from paper, or paper copy of microfilm and microfiche for international delivery -- \$16.00 up to 50 pages. (International delivery via Internet is \$13.00.)
- Duplication of NAL-owned microfilm -- \$20.00 per reel
- Duplication of NAL-owned microfiche -- \$13.00 for each 5 fiche

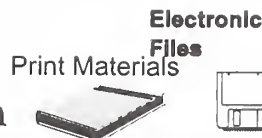
Billing -- Charges include postage and handling, and are subject to change. Invoices are issued quarterly by the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161. Phone: (703) 605-6640. Establishing a deposit account with NTIS is encouraged. **DO NOT SEND PREPAYMENT.**

Send Requests to:

USDA, National Agricultural Library
Document Delivery Services Branch, PhotoLab
10301 Baltimore Ave., NAL Bldg.
Beltsville, Maryland 20705-2351

FAX: 301-504-5675
Ariel IP address: ariel.nal.usda.gov
E-mail: lending@nal.usda.gov

Contact the Access Services, Document Delivery Services Branch at (301) 504-6503 or via Internet at access@nal.usda.gov with questions or comments about this policy.



Services Available to Libraries, Institutions and Organizations

The National Agricultural Library (NAL) accepts requests from libraries and other organizations in accordance with the national and international interlibrary loan code and guidelines. In its national role, NAL supplies copies of agricultural materials not found elsewhere. Submit requests to major university libraries, national or provincial institutions or network sources prior to sending requests to NAL. If the needed publications are not available from these sources, submit requests to NAL with a statement indicating their non-availability.

Materials in NAL's collection are not loaned outside the United States; however, copies of materials may be provided. There is a limit of 50 pages per item to comply with copyright law.

AGLINET -- Requesters in countries with an AGLINET library are encouraged to make full use of that library and its networking capabilities. As an AGLINET participant, NAL provides free document delivery service for materials published in the United States to other AGLINET participants.

Requests -- Submit requests on the American Library Association (ALA) or the International Federation of Library Associations and Institutions (IFLA) interlibrary loan form, or via electronic mail, Ariel™, or facsimile. (See further details under *For Electronic Access and Delivery* below.)

Charges:

- Photocopy, paper copy of microfilm and microfiche – \$13.00 up to 50 pages if mailed to domestic address. \$16.00 if mailed to international address. \$13.00 if sent via Internet.
- Duplication of NAL-owned microfilm—\$20.00 per reel
- Duplication of NAL-owned microfiche—\$13.00 for each 5 fiche or portion thereof
- Loans – \$15.00 per loan

Billing -- Charges include postage and handling, and are subject to change. Invoices are issued quarterly by the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161. Phone: (703) 605-6640. Establishing deposit accounts with NTIS is encouraged. Annual billing is available on request by contacting NAL at the address below. **DO NOT SEND PREPAYMENT.** You will be invoiced.

For postal service delivery send requests to: USDA National Agricultural Library
 PhotoLab
 Document Delivery Services Branch
 10301 Baltimore Ave., NAL Bldg.
 Beltsville, Maryland 20705-2351

For electronic access and delivery :

The Document Delivery Services Branch accepts ILL requests from libraries via several electronic methods. All requests must comply with established routing and referral policies and procedures. A sample format for ILL requests follows.

INTERNET.....lending@nal.usda.gov

Start the subject line with one word format:

3 letter month abbreviation + day + NAL + # of request placed that day,
For Example: jul25NAL4 (if this is the fourth request on July 25).
For Example: jul 25NAL1-4 (if this is four requests submitted at one time)
 (over)

OCLC.....AGL

TELEFACSIMILE.....301-504-5675

Requests can be created on standard ILL forms and then faxed. NAL will fill via FAX at no additional cost if FAX number is included on request. NAL will send up to 30 pages per article. If request exceeds 30 pages, NAL will ship via postal service. There is no RUSH service.

ARIEL™ariel.nal.usda.gov

NAL will fill the request via ARIEL™ if the ARIEL™ address is included in the request. NAL treats ARIEL™ at an alternative delivery mechanism--not an expedited service. NAL will send up to 30 pages per article via ARIEL™. If request exceeds 30 pages, NAL will ship via postal service.

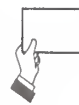
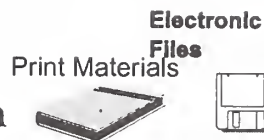
Required data elements for all requests:

- Complete mailing information for all requests regardless of method of delivery. (Borrower's Fax number or ARIEL™ IP address if delivery by either of these methods is desired.)
- Complete citation including verification (source of citation) and NAL call number if available.
- Date after which item is no longer needed.
- Copyright Compliance -- Pre-printed forms must contain your signature to indicate copyright compliance. On e-mail requests include the complete Statement of Copyright Compliance. Libraries may indicate compliance by including the initials of one statement, either "CCL" for compliance with the copyright law or "CCG" for compliance with Copyright Guidelines or a statement that the request complies with U.S. Copyright Law or other acceptable copyright laws (i.e. IFLA, CLA, etc.). Libraries must also provide authorizing official's name. Requests will be rejected if this information is not included.
- Maximum cost you are willing to pay for billing purposes.

Sample Electronic Mail Request

(Your Institutions Name)/NAL	JUL25NAL1	Date Not Needed After: 9/25/00
(Your Department or Office Your University Library or Institution City, State or Province, Country, Mail Code)		
Dr. Smith (patron name) Biology Dept. (patron office) Canadian Journal of Soil Science 1988 v 68(1): 17-27 (complete citation) De Jong, R. Comparison of two soil-water models under semi-arid growing conditions		
NAL Call Number: 56.8 C162 Ver: AGRICOLA		
Remarks: Not available at university or in region		
Authorized by: Charles Johnson	CCL	Maxcost: \$15.00
Date: mm/dd/yr		
(your) Phone# (301)555-1234		
(your) Fax#: (301)555-5678	(your) ARIEL IP Address: 111.222.333.444.555	

Contact the Access Services Librarian, Document Delivery Services Branch at (301) 504-6503 or via Internet at access@nal.usda.gov with questions or comments about this policy.



Services Available to USDA Employees

Copies or loans of NAL materials are provided free-of-charge in response to job-related requests. Requests for materials may be submitted onsite in person, electronically (via ARIEL™, email or facsimile) or by U.S. Postal Service. Employees eligible for service from a local library such as ARS field libraries or Forest Service libraries should make use of these resources before contacting the National Agricultural Library (NAL).

Copy Service

A single copy may be provided, in lieu of loan, from materials in the NAL collection. **All** requests must indicate compliance with copyright restrictions. Providing complete, accurate citations and the NAL call number for a document (if available) will speed the processing of requests.

Loan Service

The loan period for NAL materials is one month. Loans may be renewed for an additional month if no one else is waiting to use the material. Make renewal requests in writing or by calling (301) 504-5755 prior to the due date.

Booking Audiovisuals

Submit request at least 3-4 weeks before the intended show date when requesting specific audiovisual titles. Specify the particular format preferred if more than one format is given in the citation. To renew audiovisuals or inquire about booking audiovisual materials call (301) 504-5994.

Copies from Non-Circulating Materials

The following materials are non-circulating: Serials (except for USDA serials); rare, reference, and reserve books; microforms; and proceedings of conferences or symposia. Although these materials may not be borrowed if NAL only owns one copy, requests may be filled in the form of a microform or paper copy if your request indicates copyright compliance. Please indicate on your original request form if a copy of the material is acceptable in place of a loan.

Delivery Options

Electronic delivery is the preferred method of document delivery at NAL. Copies of journal articles and duplicated microform materials are delivered by facsimile, ARIEL™, or U.S. Postal Service. Copies of material will be delivered electronically whenever a fax number or ARIEL™ IP address appears on the request. Books borrowed from other sources will be delivered by FedEx to ensure their safety and receipt.

Interlibrary Borrowing or Purchase

If materials are not available at the NAL, we will try to obtain from another source. Turnaround time on interlibrary loans varies depending on location and availability of materials. If an item cannot be obtained through borrowing, NAL will attempt to purchase it, which also adds to the turnaround time.

How to Format Requests

All requests, regardless of format, **must** include the data elements listed below. A separate request form must be submitted for each document. When requesting via e-mail, however, more than one request form may be included in the same e-mail message.

Required Data Elements

- Borrower's name, full mailing address, and USDA or other eligible agency name. On e-mail requests this information must be in block format with at least two blank lines above and below so form may be used in a window envelope.
- Complete citation including verification (source of citation) and NAL call number if available.
- Date after which item is no longer needed.
- Copyright Compliance
Pre-printed forms must contain your signature to indicate copyright compliance. On e-mail requests include the complete Statement of Copyright Compliance ("I have read the warning on copyright restrictions and accept full responsibility for compliance"), **your full name, date, and telephone number in each request**. Libraries may indicate compliance by including the initials of one statement, either "CCL" for compliance with the copyright law or "CCG" for compliance with Copyright Guidelines. Requests will be rejected if this information is not included.
- Fax number or ARIEL™ IP address (if delivery by either of these methods is desired).

E-Mail Request Procedures

E-mail: lending@nal.usda.gov

Electronic mail requests may be sent via the Internet to the address above. Multiple requests may be included in a single message if they are complete unto themselves, contain all of the required data elements and closely resemble the samples below. Each request within a message must be formatted as an individual request complete with name, address, copyright compliance, and request ID number. Use the following standardized number format to identify the requests included in the e-mail message:

1st request sent to NAL on July 25 will be jul25NAL1

2nd request sent to NAL on July 25 will be jul25NAL2

Each request should cite this identification number on the request form. The number or range of numbers if more than one request is included in the same e-mail message (ex: jul25NAL1-4) should also appear in the subject line of the e-mail message.

ARIEL™ Request Procedures

NAL IP Address: ariel.nal.usda.gov

ARIEL™ is a document delivery software package (available from Research Libraries Group) which allows documents to be scanned and sent over the Internet. Requests can be submitted via email, mail, etc., or created on one of the standard forms listed under "Mail" below, scanned and sent to NAL's IP address. If an ARIEL™ 'receive only' package is loaded on to your computer you can receive and print articles at your desktop. If an ARIEL™ address is included in a request, NAL will deliver up to 30 pages per article via ARIEL™. If the article length exceeds 30 pages or cannot be scanned reliably, NAL will deliver the material via Postal Service. For more information about this software (including equipment requirements) visit RLG's ARIEL™ WWW site (http://www.rlg.org/cgi-bin/print_hit_bold.pl/ariel.html).

Mail & Fax Requests

Requests may be sent to NAL via the U.S. Postal Service or facsimile. Requests should be submitted using one of the standard forms listed below.

- AD-245 (available from USDA procurement)
- CALS Printout - copy & complete the address & copyright information from the AD245 on to the back of the CALS printout.
- Individual Request Form (IRF)
- ALA or FILLS Interlibrary Loan Form

Mailing Address:

Fax Number: (301) 504-5675

National Agricultural Library
Document Delivery Services Branch, 6th Floor
10301 Baltimore Avenue
Beltsville, MD 20705-2351

Sample Electronic Mail Request

JUL25NAL1

Date Not Needed After: 8/25/2000

Richard Smith
ARS, USDA
Research Station
Heartland, IA 56789

Canadian Journal of Soil Science 1988 v 68(1): 17-27
De Jong, R. Comparison of two soil-water models under semi-arid growing conditions.

NAL Call Number: 56.8 C162

Ver: AGRICOLA

I have read the warning on copyright restrictions and accept full responsibility for compliance

Richard Smith 7/25/00 Phone# (301)555-1234
(your) Fax#: (301)555-5678 (your) ARIEL IP Address: 111.222.333.444.555

